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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appln. Serial No.: 10/632,245
Filing Date: August 1, 2003
Applicant(s): CORTRIGHT et al.

Group Art Unit: 1754
Examiner: Langel, Wayne A.
Attorney Docket No.: 09820.284

Title: **LOW-TEMPERATURE HYDROGEN PRODUCTION FROM OXYGENATED HYDROCARBONS**

FINAL DECLARATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

To the Commissioner:

The inventors declare (1) that they are the inventors named in the above-referenced application; (2) that they have read the claims allowed in the above-referenced application; and (3) that the subject matter of said claims was part of the original invention.

The undersigned inventor declares further that all statements made herein of their own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: _____ Inventor: _____
Randy D. Cortright

Date: 4/29/05 Inventor: _____
James A. Dumesic

ALLOWED CLAIMS

1. (PREVIOUSLY PRESENTED) A method of producing hydrogen comprising: reacting water and a water-soluble oxygenated hydrocarbon having at least two carbon atoms, at a temperature not greater than about 450°C, in the presence of a metal-containing catalyst, and in the absence of added oxygen, wherein the catalyst comprises a metal selected from the group consisting of Group VIII transitional metals, alloys thereof, and mixtures thereof.

2. (ORIGINAL) The method of Claim 1, wherein the water and the oxygenated hydrocarbon are reacted at a temperature of from about 100°C to about 450°C, and at a pressure where the water and the oxygenated hydrocarbon are gaseous.

3. (ORIGINAL) The method of Claim 1, wherein the water and the oxygenated hydrocarbon are reacted at a temperature of from about 100°C to about 300°C, and at a pressure where the water and the oxygenated hydrocarbon are gaseous.

4. (ORIGINAL) The method of Claim 1, wherein the water and the oxygenated hydrocarbon are reacted at a temperature not greater than about 400°C, at a pressure where the water and the oxygenated hydrocarbon remain condensed liquids.

5. (ORIGINAL) The method of Claim 1, wherein the water and the oxygenated hydrocarbon are reacted at a pH of from about 4.0 to about 10.0.

6. (ORIGINAL) The method of Claim 1, wherein the catalyst comprises a metal selected from the group consisting of nickel, palladium, platinum, ruthenium, rhodium, iridium, alloys thereof, and mixtures thereof.

7. (ORIGINAL) The method of Claim 1, wherein the catalyst is further alloyed or mixed with a metal selected from the group consisting of Group IB metals, Group IIB metals, and Group VIIb metals.

8. (ORIGINAL) The method of Claim 1, wherein the catalyst is further alloyed or mixed with a metal selected from the group consisting of copper, zinc, and rhenium.

9. (ORIGINAL) The method of Claim 1, wherein the catalyst is adhered to a support.

10. (ORIGINAL) The method of Claim 9, wherein the support is selected from the group consisting of silica, alumina, zirconia, titania, ceria, carbon, silica-alumina, silica nitride, and boron nitride.

11. (ORIGINAL) The method of Claim 9, wherein the support is surface-modified to remove surface moieties selected from the group consisting of hydrogen and hydroxyl.

12. (ORIGINAL) The method of Claim 9, wherein the support is modified by treating it with a modifier selected from the group consisting of silanes, alkali compounds, and alkali earth compounds.

13. (ORIGINAL) The method of Claim 9, wherein the support is silica modified with trimethylethoxysilane.

14. (ORIGINAL) The method of Claim 9, wherein the support is a zeolite.

15-16. (CANCELED)

17. (PREVIOUSLY PRESENTED) The method of Claim 1, wherein the water and the oxygenated hydrocarbon are reacted at a temperature not greater than about 400°C, and further comprising reacting the water and the water-soluble oxygenated hydrocarbon in the presence of a water-soluble salt of an alkali or alkali earth metal.

18. (ORIGINAL) The method of Claim 17, wherein the water-soluble salt is selected from the group consisting of an alkali or an alkali earth metal hydroxide, carbonate, nitrate, or chloride salt.

19. (ORIGINAL) The method of Claim 1, wherein the water-soluble oxygenated hydrocarbon has a carbon-to-oxygen ratio of 1:1.

20. (ORIGINAL) The method of Claim 1, wherein the water-soluble oxygenated hydrocarbon has from 2 to 12 carbon atoms.

21. (ORIGINAL) The method of Claim 1, wherein the water-soluble oxygenated hydrocarbon is selected from the group consisting of ethanediol, ethanedione, glycerol, glyceraldehyde, aldotetroses, aldopentoses, aldohexoses, ketotetroses, ketopentoses, ketohexoses, and alditols.

22. (ORIGINAL) The method of Claim 1, wherein the water-soluble oxygenated hydrocarbon is selected from the group consisting of aldohexoses and corresponding alditols.

23. (ORIGINAL) The method of Claim 1, wherein the water-soluble oxygenated hydrocarbon is selected from the group consisting of glucose and sorbitol.

24. (ORIGINAL) The method of Claim 1, wherein the water-soluble oxygenated hydrocarbon is sucrose.

25-44. (CANCELED)

45. (PREVIOUSLY PRESENTED) A method of producing hydrogen comprising: reacting water and a water-soluble oxygenated hydrocarbon having at least two carbon atoms, at a temperature of from about 100°C to about 450°C, and at a pressure where the water and the oxygenated hydrocarbon are gaseous, in the presence of a metal-containing catalyst, and in the absence of added oxygen, wherein the catalyst comprises a metal selected from the group consisting of Group VIII transitional metals, alloys thereof, and mixtures thereof, the catalyst being adhered to a support.

46. (ORIGINAL) The method of Claim 45, wherein the support is selected from the group consisting of silica, alumina, zirconia, titania, ceria, carbon, silica-alumina, silica nitride, and boron nitride, modified to remove surface moieties selected from the group consisting of hydrogen and hydroxyl.

47. (ORIGINAL) The method of Claim 46, wherein the support is modified by treating it with a modifier selected from the group consisting of silanes, alkali compounds, and alkali earth compounds.

48. (ORIGINAL) The method of Claim 45, wherein the support is silica modified with trimethylethoxysilane.

49. (ORIGINAL) The method of Claim 45, wherein the water-soluble oxygenated hydrocarbon has a carbon-to-oxygen ratio of 1:1.

50-56. (CANCELED)

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Date: May 3, 2005 Inventor: _____
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